USING iCLICKER IN **SMALL CLASSES**

DR. BRIAN GEISLINGER teaches physics and astronomy at Gadsden State Community College in Alabama. For over ten years he's worked in classrooms that rarely have over 30 students. Throughout his career, Dr. Geislinger has been recognized with a number of awards for innovation in teaching using technology.

When you first think of incorporating iClickers into a classroom, you most likely picture a large lecture hall with hundreds of students. While the technology has a multitude of applications in this setting, it can also successfully be used in a smaller classroom, even generating benefits with less than 30 students.

Setting up a small, flipped classroom

In his physics classroom, Dr. Geislinger only averages about 15 students. He utilizes **FlipIt Physics** in a flipped classroom setting where students watch pre-lecture videos encompassing the basic concepts of the upcoming lecture. Before class, they also answer some checkpoint questions to help Dr. Geislinger gauge what students are coming into class not understanding. This information helps inform the lecture from the start, and iClicker questions in class help illuminate whether students are progressing in their understanding. These in-class questions often revisit checkpoint questions from students' pre-lecture work to check in on comprehension. **"We'll also, a lot of times, propose new questions or follow-up questions to those checkpoints to dig a little bit deeper,"** he says.

When students hit a stumbling block, Dr. Geislinger uses active learning activities to improve understanding. After class, students practice concepts by answering homework questions.

Finding similarities in big and small class sizes

iClicker essentially functions the same in both large and smaller classes because students are the same in both. Data from responses can help show where students are struggling as well as what level of comprehension students have reached. It can guide activities done in class, shifting focus to where students need it most.

Additionally, students have the same misconceptions about what they're learning no matter how many other students are in the room. According to Dr. Geislinger's research, **"The same problems with the same [physics] concepts will arise in similar percentages regardless of the number of students I have."**

Taking a deeper dive into the student makeup of any course, Dr. Geislinger demonstrates the similarities between big and small classes by categorizing students into three different types:

• **Overachievers:** You can identify these students as the ones whose hands pop up to answer questions. They may even shout out responses or actually ask questions themselves. The problem, says Dr. Geislinger, with these students, **"is that overachievers can actually be detrimental to a class as a whole if they're not utilized properly."** They can create an easy trap to fall into where

you know they know the answer, that they want to answer, so you let them respond and assume they represent enough of the class to move on to the next concept. They can also impact other students who may nod in agreement because someone else shares the correct answer, however those students, **"just think they're understanding because they hear the right answer from someone else."** Dr. Geislinger suggests redirecting the attention of an overachiever with group work. It's an ideal environment for them to help draw out other students who might not be as vocal.

- **Silent Majority:** Always making up the largest percentage of a class, regardless of size, this group simply doesn't talk during class. This can create confusion for instructors since there's no way to know whether they're getting it or not. It can be easy to assume their lack of participation means they don't understand because they don't want to, or to think their positive reaction to other's answers means they get it too when they don't. This group is most significantly helped through a classroom response system because it gives them a voice, enabling you to really understand where comprehension actually sits for your students.

- **Underachievers:** The final group is unfortunately the group that doesn't really want to learn. They may or may not come to class, they don't care whether or not they understand, and it's uncertain if they'll even do the work. Often, these students won't overcome these lackadaisical feelings in order to succeed in class no matter how you offer to help.

Within a hypothetical class of 100 students, you'd most likely get 14 overachievers, 10 underachievers, and 76 students in the silent majority. In a smaller class, the numbers go down, but the ratios stay relatively similar. You're still going to have a silent majority as your largest percentage of students in class to engage. This can be a bit more challenging in a smaller class since your silent majority loses the comfort of being in a crowd. **"Students can feel very naked and exposed when they are throwing ideas out there, and they might feel that if they throw out the wrong answer, it's going to reflect negatively on them somehow,"** says Dr. Geislinger, which is why iClickers can be so instrumental in a class of just 20 students.

Using iClicker in a small course

For Dr. Geislinger, the most important thing about iClicker is that it gives ample opportunity to turn any question into a learning experience. Even if the majority of the students get a question right, consider opening a discussion about the topic, or follow up with a poll to see if students understand why the right answer is right. If responses seem to deviate between two answer choices pretty evenly, increase the time to respond and invite the students to convince their neighbor which one is right. **"It just takes a couple of seconds of discussion to actually come to that realization,"** that you might have the wrong answer.

The only caveat to using iClicker in a smaller classroom is that you have to be slightly more flexible in how you use the data you collect. You'll see more variations between individual classes with smaller numbers, and you'll most likely need to modify your approach to activities and dealing with pain points as a result says Dr. Geislinger. Otherwise, the inclusion of a classroom response system shouldn't really be that different.

Using iClicker and flipped physics content from Macmillan in his introductory physics course, Dr. Geislinger saw an increase in general student results. He also noticed he was able to cover more content in a single semester than in previous years.